Texas State Soil and Water Conservation Board
State Nonpoint Source Grant Program
FY 2019 Workplan 19-50

SUMMARY PAGE			
Title of Project	Characterizing the Kickapoo Creek in Henderson County Watershed		
Project Goals	To provide stakeholders and agencies with sufficient information to address the bacteria and dissolved oxygen impairments within Kickapoo Creek (Segment 0605A) through watershed based planning by: • Facilitating public involvement through development and maintenance of a watershed stakeholder group, • Developing a data inventory of existing water quality and land-use information to evaluate causes and sources of pollution, • Collecting additional water quality data to aid with assessment and identification of sources.		
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) Public Participation and Stakeholder Facilitation; (4) Data Inventory and Evaluation for Watershed Characterization and Pollutant Source Identification; and (5) Water Quality Monitoring		
Measures of Success	• Successful facilitation of public involvement as measured by meeting attendance and feedback from stakeholders. • Collection of a comprehensive data inventory of existing information that provides stakeholders with an evaluation of water quality conditions, sources, and an estimate of needed load reductions for bacteria. • Collection and analysis of water quality data of known and acceptably quality for use in further assessing impairments and aid in identification of sources.		
Project Type	Implementation ( ); Education (X); Planning (X); Assessment (X); Groundwater ( )		
Status of Waterbody on *2016 Draft Texas Integrated Report*	Segment ID 0605A	Parameter of Impairment or Concern Bacteria & depressed dissolved oxygen	Category 5b (bacteria), 5c (depressed DO)
Project Location (Statewide or Watershed and County)	Kickapoo Creek Watershed in Henderson and Van Zandt Counties		
Key Project Activities	Hire Staff ( ); Surface Water Quality Monitoring (X); Technical Assistance ( ); Education (X); Implementation ( ); BMP Effectiveness Monitoring ( ); Demonstration ( ); Planning (X); Modeling ( ); Bacterial Source Tracking ( ); Other ( )		
2017 Texas NPS Management Program Reference	• Component 1: LTG 1, 2, 7, 8 • Component 1: STG 1A, 1B, 1E, 3A, 3D, 3G • Component 2, 3, 7		
Project Costs	$ 278,083		
Project Management	Texas Institute for Applied Environmental Research		
Project Period	February 1, 2019 – May 31, 2021		

Part I – Applicant Information

Applicant							
Project Lead	Leah Taylor						
Title	Sr. Project Director						
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Applicant							
Project Co-Lead	Dr. Narayanan Kannan						
Title	Research Scientist						
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City	Stephenville	County	Erath	State	TX	Zip Code	76402
Telephone Number	(254) 968-9591			Fax Number	(254) 968-9336		

Project Partners	
Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects and TCEQ.
Texas Institute for Applied Environmental Research (TIAER)	Provide project oversight, QA/QC, facilitate development of watershed stakeholder group and public outreach efforts, conduct data inventory and evaluation, and conduct water sample collection, analyses, and evaluation. Coordinate with Angelina-Neches River Authority regarding stakeholder involvement and data collection (historical and direct).
Angelina – Neches River Authority	Provide laboratory analyses for bacteria samples, guide and support gathering of historical water quality and sources information, and assist TIAER with communication and educational efforts with local stakeholders.
Watershed stakeholders including, but not limited to, landowners, soil and water conservation districts, city officials, county officials, not for profit organizations, and other federal, state, and local governments	Work with TIAER and ANRA to gain and provide needed information for the characterization of this watershed.

Part II – Project Information

Project Type							
Surface Water	X	Groundwater					
Does the project implement recommendations made in (a) a completed WPP, (b) an adopted TMDL, (c) an approved I-Plan, (d) a Comprehensive Conservation and Management Plan developed under CWA §320, (e) the *Texas Coastal NPS Pollution Control Program*, or (f) the *Texas Groundwater Protection Strategy*?			Yes		No	X	
If yes, identify the document.	N/A						
If yes, identify the agency/group that developed and/or approved the document.	N/A		Year Developed	N/A			

Watershed Information				
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)	Segment ID	Category on 2014 IR	Size (Acres)
Kickapoo Creek in Henderson County	120200010201-0201, 0202, 0203, 0204, 0205, 0206	0605A	5b & 5c	178,867

Water Quality Impairment

Describe all known causes (i.e., pollutants of concern) and sources (e.g., agricultural, silvicultural) of water quality impairments or concerns from any of the following sources: *2016 Texas Integrated Report*, Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.

The 2016 Draft Texas Integrated Report indicates the following bacteria and depressed dissolved oxygen impairments:

Segment 0605A: Kickapoo Creek in Henderson County

	Impairment	Category	Year Listed
0605A_01	bacteria	5b	2000
	depressed dissolved oxygen	5c	2006
0605A_02	bacteria	5b	2000

No concerns along Segment 0605A are listed in the 2016 Draft Texas Integrated Report, although the 2014 Texas Integrated Report and the Clean Rivers Program 2018 Basin Highlights Report by the Angelina - Neches River Authority list ammonia and depressed dissolved oxygen (DO) as a concern. Data used for the 2016 Draft Texas Integrated Report for assessment of bacteria included 14 samples for AU 0605A_01 and 20 samples for AU 0605A_01. The geometric mean of these data for *Escherichia coli* bacteria was 570 colony forming units per 100 milliliters (cfu/100 mL) for AU 0605A_01 and 250 cfu/100 mL for AU 0605A_02. For DO, only two 24-hr monitoring events were included in the assessment and both indicated average DO concentrations below the average criterion of 3 mg/L and the minimum criterion of 2 mg/L. The period of record for samples assessed in the 2016 Draft Texas Integrated Report spanned the 7-year period between December 2007 and November 2014.

Within the 2016 Draft Texas Integrated Report, point source discharges from municipal wastewater facilities were identified as sources contributing to the DO and bacteria impairments within Kickapoo Creek. As part of a Recreational Use Attainability Assessment for Segment 0605A, it was determined that two permitted municipal wastewater treatment facilities (WWTFs) discharge within the Kickapoo Creek watershed, the City of Brownsboro WWTF (TX0062707) with a permitted average daily flow of 0.156 million gallons per day (MGD) and the City of Murchison

WWTF (TX0072087) with a permitted average daily flow of 0.08 MGD. A third small WWTF (TX0133086), run by the RPM Water Supply Corporation (permitted average daily discharge of 0.01 MGD), does not discharge directly into Kickapoo Creek but to Battle Creek, which merges with Kickapoo Creek in a braided fashion as part of Kickapoo Cove of Lake Palestine. Depending on flow conditions and patterns, Battle Creek may be considered a tributary of Kickapoo Creek or a separate creek into Lake Palestine. Also, of the approximately 5,700 households in the watershed, about 89 percent were estimated to be outside municipal service areas for wastewater, so on-site sewage facilities from rural households may also be a contributing source.

Nonpoint sources via runoff across the landscape are also potential sources of bacteria and of organic loadings that may decrease instream DO. The Kickapoo Creek in Henderson County watershed area covers about 178,000 acres and is primarily rural with hay or pasture production used for cattle production as the dominant land cover followed by variety of forested vegetation. Only about five percent of the watershed is developed land representing the cities of Murchison (estimated population 600), Edom (estimated population 375), and Brownsboro (estimated population 1,050). The watershed is located just west of the City of Chandler (estimated population 2,805), but does not encompass Chandler. The rural nature of the Kickapoo Creek watershed indicates the need to consider agricultural and silivicultural nonpoint source contributions as well as WWTF discharges and on-site sewage facilities from rural households in evaluating the watershed's impairments.

Project Narrative

Problem/Need Statement

The bacterial impairment of Kickapoo Creek in Henderson County is classified 5b indicating that a review of the standards associated with bacteria is needed prior to selecting a management strategy (Figure 1). As part of this standards review, a Recreational Use Attainability Analysis (RUAA) was completed on Kickapoo Creek by TIAER in 2014. Findings of the RUAA (https://www.tceq.texas.gov/waterquality/standards/ruaas/ruaasneches) were submitted by TSSWCB to TCEQ for a potential recommendation of a change in standard from primary recreation to secondary recreation. Upon reviewing RUAA findings, TCEQ did not recommend a change in the recreational standard for Kickapoo Creek, so it remains classified for primary contact recreation.

The DO impairment for Kickapoo Creek in Henderson County is classified 5c indicating that additional data or information are needed before a management strategy is selected. The DO impairment is based on two 24-hr DO monitoring events, and at least 10 samples are required as adequate data for assessment.

To better assess Kickapoo Creek in Henderson County and identify potential causes and sources of pollution, additional water quality monitoring and a data inventory are needed to characterize the watershed. Stakeholder involvement and understanding of water quality is needed to then determine the best route for dealing with impairments in the watershed.

Project Narrative

General Project Description (Include Project Location Map)

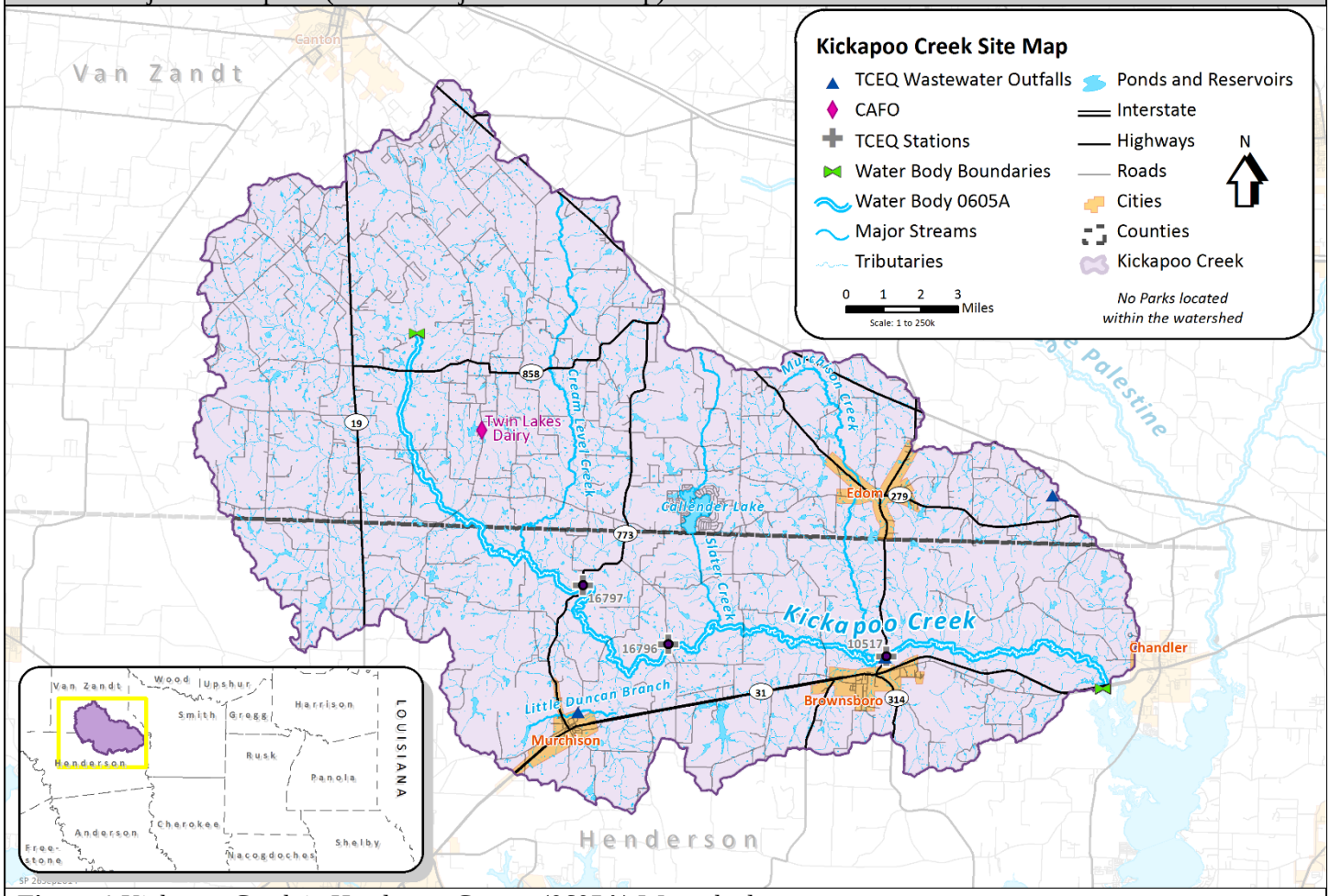

Figure 1 Kickapoo Creek in Henderson County (0605A) Watershed

In defining causes and sources of impairment, a comprehensive data inventory of existing information can be invaluable. This includes historical weather, water quality and flow data as well as information estimating wildlife and livestock densities, population characteristics, discharges from wastewater treatment facilities (WWTFs), number of on-site sewage facilities (OSSFs), and other relevant information, such as soils, topography, and land use. Much of this information is available as spatial data that can be displayed as maps via geographic information system (GIS) tools.

GIS analysis will be carried out to identify the sources of pollutants. The data required for doing the GIS analysis include, the most recent version of National Land Cover Database (NLCD 2016 [will be released in December 2018]), the soil map and the associated data from Soil Survey Geographic Database (SSURGO) data and National Elevation Dataset (NED) (https://catalog.data.gov/dataset/usgs-national-elevation-dataset-ned). For details on livestock operations, cropping system, and irrigation we will use 2017 Agricultural Census data (expected by February 2019). Types and population of wild animals and domestic pets in the watershed will be estimated and included in the analysis, because they are important sources of bacterial impairment of the Kickapoo Creek. Quantity and quality of municipal and industrial wastewater discharged to Kickapoo Creek will be obtained from the EPA Enforcement and Compliance Data website or from TECQ permit information. The water quality data currently available for Kickapoo Creek watershed that will be used in our analysis is shown in Table 1.

Table 1 Water Quality data availability for the Kickapoo Creek watershed

Monitoring Station Description	Station ID	Period of data availability						
		Flow*	Sedi-ment	Nitro-gen	Phos-phorus	DO	BOD	Bacteria
Kickapoo Creek at FM 314	10517	1978-1986	1997-2010	1997-2010	1999-2010	1997-2010	1998-2000	2000-2010
Kickapoo Creek at FM 1803	16796	--	2005-2008	2005-2008	2000-2008	2000-2008	1999-2000	2005-2008
Kickapoo Creek at FM 773	16797	2008-2016	2008-2016	2008-2016	2008-2016	2000-2016	1999-2000	2008-2017

*Instantaneous discharge only

The watershed does not have a USGS gauging station that records daily flow. Therefore, the average daily flow values will be estimated from a nearby monitored watershed (with similar land cover conditions) based on a drainage area ratio method. The other option to estimate flow is to use modeled results from any previous studies (if exists) for the same watershed.

To aid in assessing conditions under which exceedances to bacteria water quality standards occur, load duration curves (LDCs) will be developed. The load duration curve (LDC) approach (USEPA 2007), although not based on pollutant fate and transport mechanisms, provides simple ways of understanding the water quality data and interpret information. It uses time series of flow data along with water quality data (observations monitored at infrequent intervals/water quality criterion) to obtain pollutant loads. The approach allows for characterizing the water quality data by relating flow and pollutant loads. It accounts for how stream flow patterns affect changes in water quality during different seasons or flow regimes (high flow, low flow, moist conditions etc.) within a year. The duration curve approach also provides a way to link water quality impairments with watershed processes that are important to identify the pollutant sources and estimate the load reductions (USEPA 2007).

A load duration curve (LDC) is developed by multiplying stream flow value with a numeric water quality target (usually a water quality criterion e.g. nitrate target of 10 mg/L). The water quality target represents the value used to measure whether or not the applicable water quality standard (WQS) is attained. Generally, the target is the water quality criterion contained in the WQS for the pollutant of concern. The target may be constant across all flow conditions (e.g., chloride, nitrate, phosphorus, or bacteria) or it could vary with flow (e.g., sediment). By displaying pollutant loads and flow data using a duration curve framework, patterns can be identified that describe the water quality impairment. Loads that plot above the LDC indicate an exceedance of water quality criterion, while those below the LDC show compliance (Figure 2). The patterns in observed pollutant loads (estimated from monitored pollutant concentrations and observed/estimated flow) with respect to LDC can also be examined to see if the exceedance/compliance occurs across all flow conditions, corresponds to high flows alone or only to low flows. Impairments observed in the low flow zone typically indicate the influence of point sources, while those further left generally reflect potential nonpoint source contributions (Figure 2). The LDCs of dissolved oxygen (DO) and bacteria will be developed for Kickapoo Creek watershed as a part of this study.

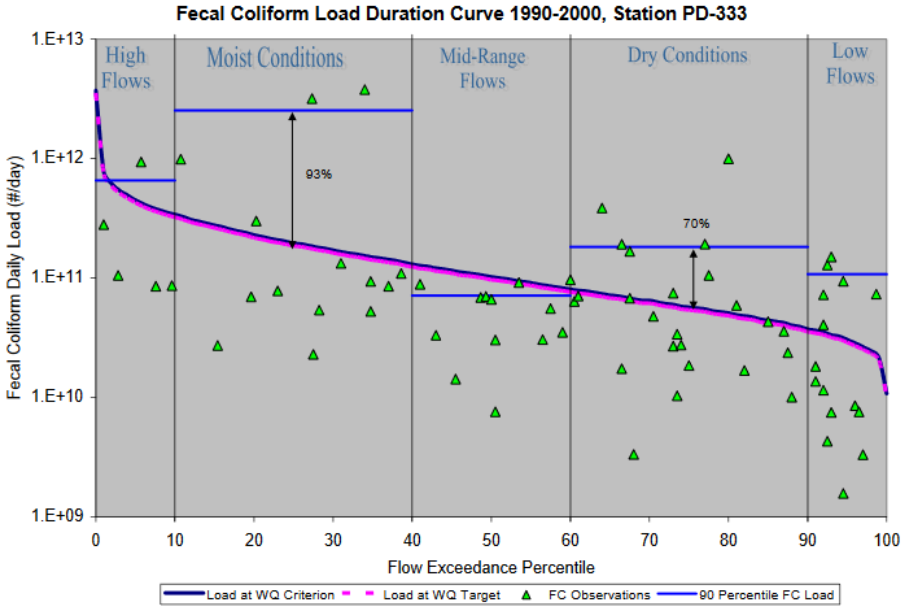

Figure 2 An example load duration curve showing fecal coliform (source: USEPA 2007)

The GIS overlay of relevant data will help to shed more light on the pollutant sources identified by the LDC. For example, if the LDC points out that the source of nutrient pollution is from a non-point source, an over lay of the drainage area of a particular water quality monitoring station with land cover data can point out the dominant pollutant source as forested area (manure nutrient discharge from wild animals in the forest) or cultivated crop land (land applied fertilizer/manure for the crop).

The LDC developed for a water quality criterion identifies the target to be achieved. The current pollutant load discharge (based on the limited water quality observations and estimated continuous flow data) will suggest whether any pollutant load reduction (with reference to the target) is needed or not. The LDC flow regimes will tentatively identify the source of pollution as point or non-point source pollution (An example outlined in Figure 2). Load reductions for the point source discharges would be rarely required because they may have already went through existing regulations such as NPDES. For the MS4 permittees, the percent reduction will be assumed the same as non-point load reduction. The nonpoint load reduction estimates for each water quality monitoring station are calculated by using the difference between estimated existing loading and the LDC. This difference is expressed as a percent reduction, and the hydrologic condition class with the largest percent reduction will be identified as the critical condition (An example outlined in Figure 2). The approach outlined here is similar to that of the method used by USEPA/TCEQ for TMDL analysis.

Direct water quality monitoring will be conducted to supplement existing data and allow better targeting of sources by increasing the frequency and number of locations where specifically bacteria data are collected. Routine water quality data will be collected monthly at up to 10 stations within the watershed for up to 20 months. Sampling will include routine field parameters (water temperature, pH, DO, conductivity, and flow) and collection of water samples for analysis of *E. coli*, ammonia (NH_3-N), total suspended solids (TSS), volatile suspended solids (VSS), nitrate-nitrogen+nitrite-nitrogen (NO_2-N+NO_3-N), total Kjeldahl nitrogen (TKN), ortho-phosphorus (PO_4-P), total phosphorus (TP), biochemical oxygen demand (BOD), and chlorophyll-a (CHLA). Water samples will be delivered to the Angelina – Neches River Authority Laboratory (ANRA) within the appropriate holding time for analysis of bacteria. All other laboratory analyses will be conducted by TIAER's laboratory. To provide additional data to aid with assessment of the indicated DO impairment, 24-hr DO monitoring will occur in conjunction with routine monthly at up to three locations. The direct data from this project will be evaluated along with historical data to indicate current conditions and trends.

Tasks, Objectives and Schedules				
Task 1	Project Administration			
Costs	$26,848			
Objective	To effectively administer, coordinate and monitor all work performed under this project including technical and financial supervision and preparation of status reports.			
Subtask 1.1	TIAER will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15th of December, March, June, and September. QPRs shall be distributed to all Project Partners.			
	Start Date	Month 1	Completion Date	Month 28
Subtask 1.2	TIAER will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.			
	Start Date	Month 1	Completion Date	Month 28
Subtask 1.3	TIAER will host coordination meetings or conference calls, at least quarterly, with Project Partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. TIAER will develop lists of action items needed following each project coordination meeting and distribute to project personnel.			
	Start Date	Month 1	Completion Date	Month 28
Subtask 1.4	TIAER will develop a Final Report that summarizes activities completed and conclusions reached during the project and discusses the extent to which project goals and measures of success have been achieved.			
	Start Date	Month 22	Completion Date	Month 28
Deliverables	• QPRs in electronic format • Reimbursement Forms and necessary documentation in hard copy format • Final Report in electronic and hard copy formats			

Tasks, Objectives and Schedules				
Task 2	Quality Assurance			
Costs	$18,702			
Objective	To develop data quality objectives (DQOs) and quality assurance/control (QA/QC) activities to ensure data of known and acceptable quality are generated through this project.			
Subtask 2.1	TIAER will develop a QAPP for activities in Task 4 and 5 consistent with the most recent versions of *EPA Requirements for Quality Assurance Project Plans (QA/R-5)* and the *TSSWCB Environmental Data Quality Management Plan*. All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the *TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)* and *Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416)*. [Consistency with Title 30, Chapter 25 of the Texas Administrative Code, *Environmental Testing Laboratory Accreditation and Certification*, which describes Texas' approach to implementing the National Environmental Laboratory Accreditation Conference (NELAC) standards, shall be required where applicable.]			
	Start Date	Month 1	Completion Date	Month 6
Subtask 2.2	TIAER will implement the approved QAPP. TIAER will submit revisions and necessary amendments to the QAPP as needed.			
	Start Date	Month 6	Completion Date	Month 28
Deliverables	• QAPP approved by TSSWCB in both electronic and hard copy formats • Approved revisions and amendments to QAPP, as needed • Data of known and acceptable quality as reported through Task 4 and 5			

Tasks, Objectives and Schedules				
Task 3	Public Participation and Stakeholder Facilitation			
Costs	$21,053			
Objective	To identify, engage, education, and gain stakeholder support for the characterization of Kickapoo Creek in Henderson County watershed.			
Subtask 3.1	Coordination of Stakeholder Group Activities –TIAER will identify and meet with key stakeholders in the watershed to inform and educate them regarding watershed water quality issues, project findings, and solicit their input on project activities.			
	Start Date	Month 1	Completion Date	Month28
Subtask 3.2	Dissemination of Project Information – TIAER will conduct outreach to inform the public about upcoming meetings, status of the project, current and historical water quality, and how the public/stakeholders can address the water quality issues in the watershed. Activities may include but are not limited to: • Hosting a project webpage (updated quarterly); • Direct mailings (one to select stakeholders); • Emails announcing events to identified stakeholders; and • Public meetings (about one per quarter) TSSWCB must review and approve all project-related content in any materials prior to distribution.			
	Start Date	Month 1	Completion Date	Month 28
Deliverables	• Stakeholder Group and Public meeting agendas, minutes, sign-in sheets, and other available documentation (as necessary) • Disseminated project information through: o Project website (updated quarterly) o Direct mailings and emails			

Tasks, Objectives and Schedules				
Task 4	Data Inventory and Evaluation for Watershed Characterization and Pollutant Source Identification			
Costs	$42,380			
Objective	Develop a comprehensive inventory of data and information to identify causes and sources of water quality impairments and concerns in the watershed and estimate loading reductions needed to meet water quality standards for bacteria.			
Subtask 4.1	TIAER will develop a comprehensive inventory for the watershed by assembling existing data and information available. This data inventory will include historical weather, water quality and flow data as well as information estimating wildlife and livestock densities, population characteristics, discharges from wastewater treatment facilities (WWTFs), number of on-site sewage facilities (OSSFs), and other relevant information, such as soils, topography, and land use.			
	Start Date	Month 1	Completion Date	Month 28
Subtask 4.2	Analyze Existing Data and Information – TIAER will use GIS mapping of information collected with the data inventory (Subtask 4.1) to spatially display potential sources of water quality impairments and concerns in conjunction with water quality information. Water quality for bacteria and flow data (estimated and direct) will be used to develop LDCs for bacteria to aid in assessing flow conditions under which exceedances to bacteria water quality standards occur.			
	Start Date	Month 1	Completion Date	Month 20
Subtask 4.3	Estimate Pollutant Loading Reductions for ***E. coli*** – Using loading data from causes and sources collected in subtask 4.1 and LDC analyses in subtask 4.2, estimated pollutant loading reductions needed to meet water quality standards and other goals will be calculated.			
	Start Date	Month 1	Completion Date	Month 20
Deliverables	• Watershed Data Inventory • Maps Showing Spatial Distribution of Potential Sources using GIS • Documentation of LDC analysis and Pollutant Reduction Estimates for *E. coli*			

Tasks, Objectives and Schedules				
Task 5	Water Quality Monitoring			
Costs	$169,100			
Objective	To collect additional water quality and flow data to aid with assessment of impairments, identification of sources, and supplement LDC analysis to better characterize impairing parameters within the watershed			
Subtask 5.1	Site Selection – TIAER will conduct sampling site reconnaissance at prospective sample sites identified to determine the suitability of sample collection that will best help characterize the watershed(s). Once site selection has been finalized, those needing TCEQ station numbers will be submitted for a Station Location request (SLOC request).			
	Start Date	Month 1	Completion Date	Month 28
Subtask 5.2	Water Quality Monitoring – TIAER will conduct routine, monthly, ambient water quality monitoring at up to 10 sites in the Kickapoo Creek in Henderson County watershed for up to 20 months. Routine field parameters will include water temperature, pH, DO, conductivity, and flow. Water samples will be collected for analysis of *E. coli*, NH_3-N, TSS, VSS, NO_2-N+NO_3-N, TKN, PO_4-P, TP, BOD, and CHLA. Angelina - Neches River Authority Laboratory (ANRA) will conduct *E. coli* analyses. All other laboratory analyses will be conducted by TIAER's laboratory. To provide additional data to aid with assessment of the indicated DO impairment, TIAER will conduct 24-hr DO monitoring in conjunction with routine monthly at up to three locations.			
	Start Date	Month 1	Completion Date	Month 28
Subtask 5.3	Water Quality Data Submission – ANRA Laboratory will transfer completed lab analysis data to TIAER who will maintain a master database of collected data. Data will be submitted to TSSWCB by TIAER for submission to SWQMIS on a quarterly basis.			
	Start Date	Month 1	Completion Date	Month 28
Deliverables	• Site Selection and SLOC requests (as needed) • Documentation of sampling events in QPRs • SWQMIS data submissions (Data sets, Data Review Checklists)			

Project Goals (Expand from Summary Page)
TIAER will work to evaluate existing data within the project area in an effort to characterize causes and sources of pollution in the Kickapoo Creek in Henderson County watershed. Data will be supplemented through monthly water quality monitoring at sites identified through the characterization process. TIAER will also calculate loadings and loading reductions needed to meet water quality standards. To gain public support of the project, TIAER will facilitate a stakeholder group (if determined to be appropriate) and identify objectives and goals needed for the watershed planning process. This will also include hosting a public stakeholder meeting each quarter where stakeholders will be updated on project progress and educated on water quality and mitigation strategies.

Measures of Success (Expand from Summary Page)
Overall, this project will be successful when stakeholders have contributed to a consensus decision of goals, objectives, and indicators for addressing the water quality issues in the watersheds. Through stakeholder involvement and public meetings, outlined in the tasks above, goals, objectives, and indicators will be tracked across meetings for consistency and overlap and presented to full stakeholder groups for a consensus decision. Further, this project will be successful when the watershed has been characterized through data collection efforts and loadings and loading reductions have been calculated. Progress will be reported in quarterly progress reports and results will be provided in a final report.

***2017 Texas NPS Management Program* Reference (Expand from Summary Page)**
Components, Goals, and Objectives
Component 1: Explicit short- and long-term goals, objectives … that protect surface and groundwater. o LTG 1: Focus NPS abatement efforts, implementation strategies, and available resources in watersheds identified as impacted by nonpoint source pollution o LTG 2: Support the implementation of state, regional and local programs to prevent NPS pollution through assessment, implementation and education o LTG 7: Increase overall public awareness of NPS issues and prevention activities o LTG 8: Enhance public participation and outreach by providing forums for citizens and industry to contribute their ideas and concerns about the water quality management process o STG 1: Data Collection and Assessment: coordinate with appropriate federal, state, regional, and local entities…. Where additional information may be needed o Objective A: Identify surface water bodies … that need additional information to characterize non-attainment of designated uses and water quality standards o Objective B: Ensure that monitoring procedures meet quality assurance requirements ….or TSSWCB Quality Management Plans o Objective E: Conduct monitoring to determine effectiveness of TMDL I-Plans, WPPs, and BMP implementation o STG 3: Education: Conduct education and technology transfer activities to help increase awareness of NPS pollution and prevent activities contributing to the degradation of water bodies, including aquifers, by NPS pollution o Objective A: Enhance existing outreach programs at the state, regional and local levels to maximize the effectiveness of NPS education o Objective D: Conduct outreach through the …Angelina – Neches River Authorities, Soil and Water Conservation Districts, and others to facilitate broader participation and partnerships. Enable stakeholders and the public to participate in decision-making and provide a more complete understanding of water quality issues and how they relate to each citizen o Objective G: Implement public outreach and education to maintain and restore water quality in water bodies impacted by NPS pollution
Component 2: Working partnerships and linkages to appropriate state, …, regional and local entities, private sector groups and Federal agencies.
Component 3: Combination of statewide nonpoint source programs with on-the-ground projects to achieve water quality benefits; … state and federal programs
Component 7: Manage and implement the NPS program efficiently and effectively, including necessary financial management

Part III – Financial Information

Budget Summary		
Personnel	$	129,730
Fringe Benefits	$	38,673
Travel	$	14,489
Equipment	$	0
Supplies	$	5,095
Contractual	$	0
Construction	$	0
Other	$	60,908
Total Direct Costs excluding TIAER Laboratory	$	248,895
Indirect Costs (≤ 15%)	$	29,188
Total Project Costs	$	278,083

Budget Justification		
Category	Total Amount	Justification
Personnel	$ 129,730	TIAER Project Manager @17.88% FTE (yr 1); 19.90% FTE (yr 2): $21,779 TIAER Research Scientist @ 24.04% FTW (yr1); 20.96 FTE (yr 2): $31,515 TIAER Sr. Research Assistant - @ 9.33% FTE (yr 1); 10.58% FTE (yr 2): $7,901 TIAER Senior Research Associate @ 10.67% FTE (yr 1); 13.17% FTE (yr 2): $13,805 TIAER Lab Manager @ 0.58% FTE (yr 1); 0.38% FTE (yr 2): $555 TIAER Research Associate @ 8.46% FTE (yr 1); 10.58% FTW (yr 2): $9,928 TIAER Research Associate @ 12.50% FTE (yr 1); 15.58% FTE (yr 2): $19,181 TIAER hourly employees: $9,370 *named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *(Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in the aggregate, will not exceed total effort estimates for the entire project.) *cell phone allowances for project calls/emails during & after business hours & travel are occasionally factored into salaries & fringe, but again, will not exceed overall dollar amount. Funds moved from Travel and Other to Personnel and Fringe Benefits category to blanket cover additional personnel time for 4 month extension. Work included will be additional monitoring, extra time spent on report preparation, writing, and review.
Fringe Benefits	$ 38,673	Salaried Employee Fringe Benefits Calculated at: 0.168 * salary + $747/mo. Hourly Employee Fringe Benefits Calculated at: 0.1 * salary. *(Fringe benefits estimates are based on salary estimates listed. Actual fringe benefits will vary between months coinciding with percent effort variations; but in the aggregate, will not exceed the overall estimated total.) *cell phone allowances for project calls/emails during & after business hours & travel are occasionally factored into salaries & fringe, but again, will not exceed overall dollar amount.
Travel	$ 14,489	Travel by field crew (2 teams of 2 people) to and from Kickapoo watershed for site reconnaissance and set up during year 1 only, hotel $93/night, and meal per diem $51/day. Travel by field crew (2 teams of 2 people) to and from sampling sites for sample retrieval and general maintenance (estimated 8 trips during year 1 and 12 trips during year 2) to sampling sites, hotel $93/night, and meal per diem $51/day. By TIAER staff to and from stakeholder and steering committee meetings (6 overnight trips/year for 3 people, Stephenville to the Kickapoo Creek watershed, hotel $93/night, and meal per diem $51/day). Due to the world wide pandemic of COVID-19, travel was reduced and moved to Personnel and Fringe Benefits to cover the 4 month extension (which includes additional time spend on the preparation, writing, and review of the final report) and additional monitoring.
Equipment	$ 0	N/A

Supplies	$	5,095	Waders, paint/batteries/ice/water, mailing envelopes and labels, etc. Freezer for Chl-A samples (to be cost shared with other projects) Fuel: Reconnaissance (year 1 only) - about 1,000 miles (2 TIAER trucks), fuel mileage about 13 mpg, fuel cost estimated at $3/gallon Fuel: Monitoring - Travel by field crew (2 teams of 2 people) to and from sampling sites for sample retrieval and general maintenance (estimated 8 trips during year 1 and 12 trips during year 2) to sampling sites, about 600 miles for one sampling team per trip including submitting samples to ANRA and 450 miles for second team per trip using TIAER trucks, fuel mileage about 13 mpg, fuel cost estimated at $3/gallon Fuel: By TIAER staff to and from stakeholder and steering committee meetings (6 overnight trips/year for 3 people, Stephenville to the Kickapoo Creek watershed about 400 miles round trip using TIAER trucks, fuel mileage about 13 mpg, fuel cost estimated at $3/gallon
Contractual*	$	0	N/A
Construction	$	0	N/A

Other	$ 60,908	ANRA Laboratory Costs: 10 stations monthly for 18 months (bacteria only) • Laboratory Analysis for bacteria: 180 samples @ $30 each = $5,400 TIAER Laboratory Costs: 10 stations monthly for 18 months • Laboratory Analysis for TSS: 180 samples @ $22.41 each = $4,033.80 • Laboratory Analysis for VSS: 180 samples @ $31.64 each = $5,695.20 • Laboratory Analysis for TNH3-N: 180 samples @ $29.85 each = $5,373 • Laboratory Analysis for TNO23-N: 180 samples @ $31.83 each = $5,729.40 • Laboratory Analysis for Orthophosphorus: 180 samples @ $21.68 each = $3,902.40 • Laboratory Analysis for Total Phosphorus: 180 samples @ $37.37 each = $6,726.60 • Laboratory Analysis for Total Kjeldahl Nitrogen: 180 samples @ $32.94 each = $5,929.20 • Laboratory Analysis for CBOD20 (dissolved and total): 180 samples @ $85.84 each = $15,451.20 • Laboratory Analysis for Chlorophyll A with Pheophytin: 180 samples @ $47.78 each = $8,600.40 Project website domain through GoDaddy.com: $814 for 3 years Vehicle maintenance for reconnaissance, monthly monitoring, and public meetings: 21,277 miles @ $0.12 = $2,553.20 Postage fees for 8 meetings over 2 years: $700 Funds moved from Other to aid in covering additional Personnel time on the preparation, writing, and review of the final report.
Indirect	$ 29,188	Total indirect calculated 15% of modified total direct = total direct ($248,895) minus total TIAER laboratory costs ($54,308).